

# New Perspectives, Interesting Discoveries: A Postprint on the Quantitative and Graphical Analysis of People' s Daily Front-Page Headlines in August 2015

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## Abstract

Quantitative research on headlines responds to the demands of the current big data era. Quantitative research on the front-page headlines of *People' s Daily* serves to accumulate paradigmatic samples and offers valuable insights. A mathematical interpretation from the perspective of integrating quantitative and visual analysis reveals innovative features in headline formatting. By acquiring sufficient data, establishing a headline database, and creating models or paradigms, we can achieve modularization, systematization, and universalization of headline formats, thereby facilitating headline standardization and intelligent typesetting.

## Full Text

### Abstract

Quantitative research on headlines is essential in the era of big data. Analyzing front-page headlines of *People' s Daily* yields typologically significant samples that provide valuable insights. Interpreting these headlines mathematically through the integration of quantitative and geometric perspectives reveals novel formal characteristics. By establishing a comprehensive headline database and developing models or paradigms, we can achieve modularization, serialization, and universalization of headline formats, thereby promoting headline standardization and intelligent layout design.

**Keywords:** *People' s Daily*; front-page headlines; quantitative-geometric analysis

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Marx once observed that any discipline not combined with mathematics cannot become a true science. In today's big data era, all fields of study rely on data acquisition and model construction to enhance their vitality and scientific rigor. Newspaper headline creation remains a discipline that is easier to grasp intuitively than to articulate explicitly, requiring empirical data to reveal hidden patterns and trends. This paper applies mathematical thinking to analyze newspaper headlines, examining and interpreting the front-page headlines of *People's Daily* from August 2015 through the lens of numbers and shapes, yielding novel and intriguing discoveries.

## 1. Graphic Description of Headlines

### 1.1 Rectangular Forms and the Pareto Principle

The ratio of headline area to type area conforms to the “80/20 rule” observed in social phenomena. *People's Daily* published 31 issues in August 2015, truly a daily newspaper. The front-page headlines varied daily in length, height, and orientation, making individual comparisons difficult. However, by applying mathematical “holistic thinking” to integrate these dimensional variations, we can measure headline area using rectangular regions. Calculating the daily ratio of headline area to total type area (50.5 $\times$ 35.2 cm) yields an average of 24.08%, approximating 20%. This demonstrates that a minority of space (the critical few) generates the majority of impact (the important many), aligning with the Pareto Principle.

Headlines occupying a small area yet exerting significant influence aligns with their role in newspapers and journalism. Headlines serve as the “eyes” of news, capturing the essence and spirit of each story in the most compelling and concise manner. A well-crafted headline represents at least half the success of a news item or entire page, attracting readers and fulfilling the market adage: “Read the headline first, then the article.” The editorial team of *People's Daily* flexibly managed the proportion of headline area in August 2015, rationally arranging headlines based on daily news significance and editorial priorities. The maximum headline area occurred on August 21, reaching 37% of the type area with nine news items and nine headline regions.

### 1.2 Go-Inspired Layout Patterns

Examining individual headlines collectively reveals that over 80% of front-page headline areas exhibit Go board arrangement characteristics—“precious corners, valuable edges, worthless center”—emphasizing the four corners, hugging the margins, and employing diagonal symmetry. The visual center of the page (near the intersection of the two diagonals) typically avoids independent headlines or

minimizes them, as seen in the layouts of August 3 and 6. The August 6 edition featured corner headlines including the lead feature “Huzhou’s ‘Green’ and ‘Rich’ Seek Win-Win,” a secondary commentary “Ideological Consciousness Guides Action,” a lower-left news item on daily fines exceeding 230 million yuan, and a lower-right guide with three headlines and summaries. Each article received prominent headline treatment, with heights and widths exceeding those in the central type area.

### 1.3 Four Layout Typologies

Integrating headlines and body text as blocks (elements) and treating several blocks as sets, we can classify the August 2015 front pages into four types based on set intersections, each averaging approximately eight days.

**Horizontal Grass-Stack Type [Figure 1: see original paper]:** The front pages of August 3, 5, 7, 9, 11, 16, 19, 25, 30, and 31 belong to this category, comprising 36% of the month’s 31 editions. The type area is horizontally divided into two or three sections, each containing 2–5 news items or blocks forming a set. The intersection between sets is empty or minimal, with boundaries represented by straight lines or closely spaced parallel lines. The shape resembles grass stacks in pastoral harvesting or cross-sections of regularly piled railroad ties, with blocks decreasing from bottom to top, creating stability with variation.

**Vertical Branch Type [Figure 2: see original paper]:** The front pages of August 1, 2, 10, 13, 14, 17, 23, 24, 27, and 28 exhibit this pattern, accounting for 32% of editions. The type area is vertically bisected along the central axis, creating symmetrical left (including masthead) and right rectangles. Set intersections are empty or minimal, demarcated by boundary lines or small image captions. The vertical axis serves as the trunk and inter-set boundary, with horizontal headlines branching outward and body text resembling leaves growing upward layer by layer, flourishing like sesame blossoms reaching new heights.

**Hunting Inverted Type [Figure 3: see original paper]:** Only the August 4 and 29 editions display this pattern, representing 6% of the month’s total. Set intersections are empty, clearly demarcated by boundary lines. A photograph approximately 10 cm high and 17.6 cm wide anchors the bottom center, with the remaining type area vertically divided into two sets, resembling a hunter’s inverted prey hung from a tree trunk. The left half’s headlines gradually decrease in size from top to bottom or maintain equal width. In August, 22 editions (71%) showed progressively shrinking left-half headlines, while nine editions featured predominantly 17.6 cm-wide left-half headlines. On August 4, the left-half headline dimensions exemplified this “small-short-low-light” characteristic: decreasing areas from  $66.88 \text{ cm}^2$  ( $3.8 \times 17.6$ ) to  $11.04 \text{ cm}^2$  ( $1.2 \times 9.2$ ), with corresponding main headline heights of 1.6 cm, 1.3 cm, 1.3 cm, 1.0 cm, and 0.65 cm, and widths of 16.8 cm, 15.8 cm, 10.6 cm, 8.7 cm, and 8 cm, with progressively lighter ink density—reflecting editorial prioritization of articles.

**Taiji Whirl Type [Figure 4: see original paper]:** The front pages of

August 6, 8, 12, 15, 18, 20, 21, and 22 exhibit this pattern, comprising 26% of editions. These layouts feature extensive intersections between sets. A central news item or headline serves as the circle's center, with other news blocks or headlines rotating clockwise around it from the lead or dual leads, forming a Taiji diagram with dynamic movement. Headlines are positioned along the type area's periphery and vertical edges to attract attention. The lead headline and lower-right headline, as well as the upper-right and lower-left headlines, are rendered using different techniques to achieve visual symmetry and balance along the diagonal axis. Of the 31 August editions, only August 5, 17, 19, 24, and 28 deviated from this pattern, indicating that 84% of layouts shared this characteristic.

#### 1.4 Headline-Body Positional Relationships

Headline regions form rectangular sets (H-sets), while body text regions (including images) form separate rectangular sets (B-sets). Three positional relationships exist: (1) Parallel relationship (H-set above, left, or right of B-set with empty intersection) occurs 225 times (84%); (2) Containment relationship (H-set as proper subset of B-set, surrounded by body text) occurs 7 times (2.6%); (3) Intersection relationship (partial overlap at corners) occurs 36 times (13.4%). When left and right halves simultaneously exhibit regular shrinking and expansion, the headline contours form two similar right trapezoids with approximately coincident or parallel slanted sides [Figure 5: see original paper].

## 2. Data Description of Headlines

Quantitative analysis of headlines yields multi-dimensional samples, as shown in Table 1.

**Statistical Overview:** August 2015 featured 31 front pages with 294 total headlines (9.5 per page), including 255 horizontal headlines (89.8%, 8.52 per page) and 30 vertical headlines (10.2%, less than one daily average). Maximum headlines per issue: 12 (August 12, 18, 20); minimum: 4 (August 16). The 31 front pages published 255 news items (8.2 daily average), with 11 items on August 18, 20, and 22 (maximum) and 5 items on August 5 (minimum). Total news items fell short of headline count by 39, as some headlines lacked accompanying articles.

**Dimensional Analysis:** The average headline area was  $99.4 \text{ cm}^2$  (5.6% of type area), with maximum single headline area of  $244.7 \text{ cm}^2$  (August 16 lead) and minimum of  $11.7 \text{ cm}^2$ . The widest horizontal headline measured 27.6 cm (August 21 lead story on Tianjin Port explosion). Average headline width was 14.7 cm, height 13.5 cm, and main headline character height 12.2 cm. The average daily headline area ratio was 2.86% (approximately  $51 \text{ cm}^2$ , comparable to half an adult palm), with maximum daily average of 6.1% (August 16) and minimum of 1.73% (August 12). Total headline area across all editions reached  $3,881 \text{ cm}^2$ , with total width of 405 cm and total height of 3,587 cm, comprising

2,458 characters.

*Note: Figure translations are in progress. See original paper for figures.*

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